

GREENING TRANSMISSION AND DISTRIBUTION

**A CONSULTATION PAPER BY
THE DIRECTOR GENERAL OF ELECTRICITY
SUPPLY FOR NORTHERN IRELAND**

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1. Introduction

Ofreg is currently conducting a review of the price controls of NIE's Transmission and Distribution Business (T&D).

T&D provides the conduit connecting producers of electricity to final consumers. It is in the main inert and not capable of being manipulated to provide a wide variety of environmental outcomes. Nevertheless, it does have some effect on the total impact of the electricity supply industry on the environment and on emissions.

Price controls provide incentives to companies to conduct their business in such a way as to maximise their returns to shareholders through meeting the required standard of safety and operational performance at least cost.

The purpose of this paper is to stimulate discussion on ways in which the T&D price control could be structured to incentivise NIE to minimise emissions and in particular greenhouse gas emissions.

It is, however, important to sound a warning about cost. While some ideas may impose no or little additional cost, others may come with a cost. It would be necessary to carry out a cost benefit analysis of such proposals. There is little point embarking on high cost CO₂ savings in T&D when equivalent savings at lower unit cost can be made elsewhere in the electricity supply chain.

Views are sought on the topics discussed in this paper

Comments and further ideas on ways of "greening" the T&D price control would be welcome and should be sent to Alan Smith before **31 July 2001** at

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2. Transmission and Distribution Losses

(a) Background

More electricity is sent out from power stations than is delivered to final customers. The difference is “lost” en route. Losses have been reducing and have fallen from about 10.5% at privatisation to 9.5% now. This 1% reduction in losses avoids annually the burning of the equivalent of 9 million therms of gas and consequently the emission of approximately 50,000 tonnes of CO₂ into the atmosphere per annum. T&D is penalised if losses are higher and makes additional profits if it exceeds the losses target. Each successive tightening of the losses figure makes further gains harder to achieve, though currently NIE is exceeding the target. As generation efficiency improves through CCGT technology and more reliance is placed on renewables, losses may become less environmentally damaging. However, as reduced emissions losses would reduce total output required, the cut-back in generation required in any half hour period should be borne by the plant with the highest marginal cost. For much of the year the marginal plant might still be one with high levels of emissions.

(b) Cost reflectivity

Hitherto, the losses incentive in NIE’s price control has been a monetary payment based on an estimation of generation costs which have been avoided by the reduction in losses. The avoided generator costs are estimated on the basis of the average total costs which the Power Procurement Business pays for all units. The payment is therefore based on a proportion of fixed costs (availability costs and system support costs) which are not genuinely avoided - at least within the price control period - and fuel costs which are genuinely avoided costs. NIE’s losses incentive payment last year (2000/2001) was £1.66m. Of this about £0.9m would have been in respect of fuel and about £0.76m in respect of other system costs. This means that in effect NIE has collected money twice for a proportion of its fixed costs and the cost to customers exceeds the benefit to customers in the form of their avoided costs. Views are accordingly sought on:

- (i) whether the losses calculation should be based on total costs or only on avoided fuel costs;
- (ii) whether paying on fixed costs in effect means that customers have paid twice on a small element of the fixed costs in the contract, i.e. 100.67% of the availability payments which customers were contractually obliged to pay. This means that the benefit to

customers of the losses incentive may be exceeded by the cost. Should this excess element in the losses payment under the current price control be recovered from NIE?

- (iii) should that payment of the losses incentive to NIE be dependent on the net position of customers being improved? In other words the saving in avoided costs to customers each year must equal or exceed the incentive payment to NIE?
- (iv) should the incentive payment to NIE simply be replaced by a penalty if the losses target is exceeded?

(c) **Effect of Market Opening**

Until 1999 all units using the system were sold by PPB which made calculating the costs of reduced losses a simple matter. This is no longer the case with market opening. All customers benefit from reduced losses as they require fewer units to be generated by the power stations of their suppliers and all pay for the capital investment of NIE through the Use of Systems charges which finance the network investment which makes the losses reduction obtainable. Up to now the losses have been calculated on the basis of an estimation of PPB's avoided costs. The question arises as to how the value of avoided units should be calculated in future. While a competitive market should converge, with merit order despatch IIPs have "must run" rights and there is no guarantee that the PPB avoided costs are the system's true marginal costs. Should the avoided costs be calculated on the PPB's avoided costs as the PPB is likely to remain generator of last resort for the next price control period or should the TSO be asked to produce an annual calculation of avoided costs on the basis of a methodology to be agreed with the Regulator?

(d) **Strengthening NIE's Incentive**

The incentive has been a combination of "stick and carrot". If losses rose above a prescribed level NIE incurred costs; if they fell below a certain level NIE made additional profits. Retaining the mixture of "stick and carrot" means progressively making the target more challenging. On the other hand further reductions may be progressively harder to achieve and the environmental benefit may also be less. What combination of regulatory incentives would work best for the environment, customers and NIE in the future? Should the regulatory five year target imposed on the company be repeated, or should NIE be invited to come forward with its own "losses reduction plan" showing the cost and benefits to the environment, customers and shareholders, over a five year or longer period of NIE's choosing?

3. **Separating Transmission & Distribution**

As Transmission becomes increasingly associated with cross-border and NI/GB trade, there may be a case for separating the losses factor for Transmission and Distribution. In percentage terms transmission losses are smaller but they will have an impact on the costs customers face who use the NI Transmission network for moving electricity to and from the Irish Republic. Distribution networks - unlike the transmission network for the NI market - are used by renewables. As renewables' share of total consumption rises so will the environmental cause for concern about distribution losses diminish. (The economic cause for concern would of course remain undiminished). Should separate losses reduction incentives be set for distribution and transmission reflecting the differences in scope for achieving reductions and differing environmental benefits?

4. **Units Component in the Price Control**

There is a relationship between the growth in the demand for electricity and the amount which must be invested in the network. UK price controls have therefore had a component in their price control which allowed revenues to increase as the number of units increased.

It could be argued that while there is a relationship between network costs and demand growth, the relationship is neither linear nor immediate; that companies should be encouraged to accommodate growth as far as possible without increasing costs and that in any event the growth is in small increments whereas the expenditure will come in steps and in all likelihood in the next, rather than the present price control and can be recognised at that point. A units component in a price control might therefore serve as a perverse incentive to increase units flowing through the network.

In Northern Ireland the units component of the T&D price control has been smaller than in GB. Despite this, demand has grown faster here and in all probability demand growth is largely, but not entirely exogenous. However, the T&D price controls in NI have been based on forecast units but with revenue based on actual units.

NIE's Supply price control now incentivises the Supply business to sell fewer units of electricity by rewarding investment in energy efficiency. It would be somewhat incongruous if NIE were given - even in appearance - incentives which pushed one of its regulated businesses to seek to promote demand growth and another to replace demand growth with more efficient use of electricity. Moreover, even if NIE T&D does not seek to pursue a commercial advantage by encouraging the growth in demand for electricity - and Ofreg is satisfied that there is no NIE strategy to do so - it is important for T&D's role as

a facilitator of all other industry players that it should be beyond suspicion in this matter. With the present regime it is arguable that this is not the case. For example, in its response to self-generation - which takes traffic away from the network - it is difficult for NIE to satisfy prospective CHP developers that it has no commercial interest in discouraging, by its charges, more widespread application of CHP. Moreover, as wheeled units from CHP and renewable generators are exempted from the Transmission UoS, it is arguable that there should be a difference in approach to the Distribution & Transmission price controls. Transmission investment is lumpier and with longer lead-in times than Distribution investment and for that reason it is even less likely to respond to growth within the price control period. Historically the transmission and distribution networks have - net of losses - carried the same number of units as all power came from large power stations connected to the transmission network. With the advent of smaller generators (see section below on embedded generation) connected to the network at lower voltages it becomes theoretically possible for the distribution network to carry in aggregate a greater number of units for the Northern Ireland market than the transmission network - leaving aside those few customers in Northern Ireland who may be connected to the high voltage network.

Views are sought therefore on the extent to which the price controls should seek to disincentivise the T&D business from having an interest in demand growth and in particular if:

Transmission should have no units component; and

Distribution should be incentivised to carry more units than the transmission network - net of losses adjustments - thereby aligning distribution incentives with the promotion of CHP and renewables.

5. **Embedded Generation**

Losses can be reduced by the use of small scale generation embedded in the low voltage network. The electricity from such generators is absorbed in the locality and the losses are reduced below the level that would be incurred with power delivered from remote power stations. In some circumstances, embedded generation can be a cost effective alternative way of strengthening the rural network. For such generation to be effective it would have to be despatchable by the system operator. A biomass or landfill gas plant would be suitable or a hydro with an all-year round water supply. Wind probably would not.

At present T&D has no incentive to consider such a solution were one to be technically available. To ensure that embedded generation was evaluated on equal terms with network reinforcement T&D could be permitted to grant aid small scale embedded generation - whether owned by NIE or another operator. If £500,000 invested in network reinforcement or allocated as grant aid to embedded renewable or CHP generation gave equivalent results customers

should be indifferent. If T&D were allowed to record the grant in its assets register and earn the same rate of return it too should be indifferent. T&D would have to have strong contractual relations with the generator to ensure that the plant remained in place in working order for an agreed period and was despatched as required by NIE.

Views are sought on the desirability of allowing T&D to support embedded CHP or renewable generation in appropriate circumstances and earn its normal rate of return on such a financial contribution.

6. **Greening Connections**

The policy currently followed with new connections is based on bringing the network up to the level required to support the new connection. Under existing policy some new connections are fully financed by the customer and some are partly financed by the customer. Connection charging is the subject of a separate consultation which will be issued shortly.

In its approach to connections T&D might be required to carry out an analysis of the most cost effective balance between strengthening the network and meeting the customer's requirements in other ways - for example, through the provision of on-site renewable energy sources. To the extent that customers were paying for the connection they would have to be free to choose a conventional connection even if this were the dearer option.

Views are sought on the feasibility of requiring T&D to offer an analysis of the costs and benefits of green alternatives to network costs when dealing with new connections.

7. **Different charges for renewable electricity**

While at present renewable and Combined Heat and Power (CHP) generators do not pay a transmission use of systems charge (TUoS) when they export electricity from site, renewable and CHP operators and developers complain that the complexity of T&D UoS charges is a barrier to the development of both renewable and CHP generation. Would it be more effective in encouraging the development of renewable electricity and CHP and reduce the complexity of use of systems charges for small renewable generators if they faced a lower use of systems charge - or would this lead to market distortions? If a flat rate charge for Renewables and CHP operators were acceptable what percentage should it be of the annualised cost?

Views are sought on a special charging regime for renewable and CHP generators.

8. **Green Interconnector corridors**

Green generators in Northern Ireland may seek to export and green suppliers to import. To do this they must have access to interconnectors on predictable terms. Competing against conventional generators and suppliers may result in their being crowded out of the interconnectors. Should a fixed number of megawatts of capacity - say 50 MWs - on the interconnectors be reserved for renewables at a prescribed price with such capacity only being available to non-renewable generators if it is not booked and used by renewable generators.

Views are sought on the desirability of reserving “green corridors” on the interconnectors, the amount of capacity, if any, which should be reserved and on mechanisms for doing so.